REMARKS

Claims 1-5 and 14 are pending in this application. By this Amendment, claim 1 is amended. Support for the amendment may be found in the specification at, for example, Table 1, Example 3. No new matter is added. Reconsideration of the application based upon the above amendments and the following remarks is respectfully requested.

The courtesies extended to Applicants' representatives by Examiner Lee during the telephone interview held May 1, are appreciated. The reasons presented during the interview as warranting favorable action are incorporated into the remarks below and constitute Applicants' record of the interview.

I. Obviousness-Type Double Patenting Rejection

The Office Action provisionally rejects claims 1-5 and 14 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4, 10, and 14-16 of copending Application No. 10/713,104. Without admitting to the propriety of the rejection, and in the interest of advancing prosecution, Applicants are simultaneously filing herewith a Terminal Disclaimer over the cited reference, thus obviating the rejection.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

II. Rejections Under 35 U.S.C. §103

A. Lampe-Onnerud

The Office Action rejects claims 1 and 14 under 35 U.S.C. §103(a) as obvious over U.S. Patent Application Publication No. 2002/0192552 to Lampe-Onnerud et al. ("Lampe-Onnerud"). Applicants respectfully traverse the rejection.

Independent claim 1 has been amended to recite, *inter alia*, a composite oxide powder having a total composition represented by $Li_aNi_bCo_cBa_dAl_eO_x$ where d/(b+c) is from 0.0005 to 0.007 and b+c=1.

Lampe-Onnerud does not teach or suggest a composite oxide powder having a total composition represented by the formula of independent claim 1. The Office Action asserts that at the time of invention it would have been obvious to substitute barium and aluminum, respectively, for the magnesium and manganese of Lampe-Onnerud's example 6. The Office Action further asserts that this is because Lampe-Onnerud discloses a limited class of compounds that can be interchanged for compounds A and B. However, making the substitution asserted by the Office Action does not result in a composite oxide powder having a total composition represented by the formula of independent claim 1. The substitution suggested by the Office Action results in a compound having a chemical formula of $Li_1Ni_{0.87}Co_{0.08}Mg_{0.01}Mn_{0.05}O_2$. In this formula a = 1, b = 0.87, c = 0.08, d = 0.01 and e = 0.05. Thus, d/(b+c) = 0.0105 which falls outside the claimed range of independent claim 1. Additionally, b+c = 0.95, which does not satisfy the limitation of claim 1 that b+c = 1. Thus, Lampe-Onnerud fails to teach or suggest a composite oxide powder, as claimed. Accordingly, Lampe-Onnerud would not have rendered obvious independent claim 1.

Support for amending claim 1 can be found in Table 1, Example 3. During the interview, the Examiner questioned how Table 1, Example 3 related to independent claim 1. Overall, the specification discloses producing Li-Ni-Co-Ba-Al composite oxides that are formed by firing the raw materials in an oxygen atmosphere. *See* specification at page 10, lines 13-18, and page 14, lines 15-19. Table 1 discloses compositions that are fired in an oxygen atmosphere. *See* specification at page 14, lines 18-22. Firing a composition in an oxygen atmosphere inherently forms oxide compounds. Table 1 simply omitted the oxide component for simplicity, as the oxide content was not specifically determined. Thus, based on the whole specification, Table 1 represents compositions of compounds that are fired in an oxygen atmosphere to produce composite oxides containing Li, Ni, Co, Ba, Al and O.

In addition, Example 3 of the present specification is not being used to limit the elemental composition of the compound. Rather it is being used to limit the molar ratio of Ba based on Ni and Co. Example 3 specifies a specific molar ratio of Ba based on Ni and Co, thus the molar ratio of Ba based on Ni and Co in claim 1 may be limited by the molar ratio of Example 3.

The composition and ranges described in Lampe-Onnerud are too broad to support a prima facie case of obviousness. MPEP 2144.05 states "if the reference's disclosed range is so broad as to encompass a very large number of possible distinct compositions, this might present a situation analogous to the obviousness of a species when the prior art broadly discloses a genus." MPEP 2144.08 cites to *In re Baird*, 16 F.3d 380, 382 29 USPQ2d 1550, 1552 (Fed. Cir. 1994), which states "[t]he fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious." Lampe-Onnerud's formula provides an extremely large number of possible distinct compositions, and thus it would not have been obvious for a person skilled in the art to select Applicants' specific claimed compositions from Lampe-Onnerud's broad disclosure.

Comparing the instant claim to the composition of Lampe-Onnerud, Applicants specifically claim barium as element "A" and aluminum as element "B." Applicants also further limit the claimed compositions to very narrow ranges of barium and aluminum. Applicants' compositions have a barium range of about 0.0005 to about 0.007 and an aluminum range of about 0.01 to about 0.1, where each range is given as the value against the sum of the mole composition ratio of nickel and cobalt, as claimed. If Lampe-Onnerud's formula is converted to the sum of the mole composition ratio of nickel and cobalt, then the range of composition for both elements "A" and "B" become 0.0 to about 0.25.[1]

[1] Formula used: A = x2/(1-z1), B = z1/(1-z1), when x2, z1 = 0 to 0.2 then A, B = 0 to 0.25.

Nowhere does Lampe-Onnerud teach or suggest selecting Al or Ba, alone or in combination, as elements of the disclosed composition. Lampe-Onnerud does not disclose any example that includes Al or Ba in its composition. In fact, Lampe-Onnerud's examples only disclose compositions that include magnesium, manganese or boron.

Lampe-Onnerud also specifies at least one of four specific elements for element "A" and at least one of seven specific elements for element "B." The Office Action asserts that Lampe-Onnerud discloses the claimed composition by selecting Ba from among Ba, Mg, Ca, and Sr while simultaneously selecting Al from among B, Al, Ga, Mn, Ti, V, and Zr and then inserting them into Example 6. However, Lampe-Onnerud does not disclose the selection of either Ba or Al from the listed elements because Lampe-Onnerud does not disclose any example that includes either of these elements in its composition. Also, taking only one element for each of "A" and "B" yields twenty-eight different element combinations that could potentially be inserted into Example 6, with the number of possible element combinations increasing exponentially where more than one element is selected for elements "A" and/or "B." In contrast to these broad and numerous possibilities, instant claim 1 is limited to the selection of barium and aluminum as Lampe-Onnerud's elements "A" and "B." From among Lampe-Onnerud's numerous possible combinations, claim 1 is directed to a single combination that is nowhere specifically taught nor suggested in the reference. Thus, Lampe-Onnerud does not render obvious the claimed invention because it would be impossible for a person skilled in the art to select the combination of Ba and Al through routine testing.

Still further, the claimed combination is more limited in its content ranges to provide a barium content of about 0.0005 to about 0.007 and an aluminum content of about 0.01 to about 0.1. As such, even the claimed content ranges correspond to only 2.6% of the range for

Lampe-Onnerud's element "A" and 36% of the range for Lampe-Onnerud's element "B." The instant claim thus covers only a small fraction of the broad disclosure of Lampe-Onnerud.

Applicants selectively claim these composition ranges because they are the only barium and aluminum ranges for which the purpose of the present invention can be achieved. For example, Comparative Example 3 of Table 2 of the present specification shows barium equal to 0.2. This composition is encompassed by Lampe-Onnerud's ranges but is outside Applicants' claimed range. Even though only barium is outside the claimed range, appropriate thermal stability cannot be obtained and the discharge capacity is also degraded. Comparative Example 5 of Table 2 contains only aluminum. In the absence of barium, the cycle performance, the safety performance and the discharge capacity all proved inferior to the claimed invention. Lampe-Onnerud nowhere teaches these specific effects that are provided by the claimed invention, and nowhere teaches or suggests that the elements and content amounts could or should be specifically selected to provide these beneficial results.

Accordingly, Lampe-Onnerud does not teach or suggest a positive electrode material for a lithium secondary battery according to the specifically selected compositions, as claimed.

Claim 14 depends from independent claim 1. Because Lampe-Onnerud fails to teach or suggest the features cited in independent claim 1, dependent claim 14 is patentable for at least the reasons claim 1 is patentable, as well as for the additional features it recites.

Accordingly, Lampe-Onnerud fails to teach or suggest a positive electrode material for a lithium secondary battery, as claimed. Lampe-Onnerud thus would not have rendered obvious the claimed invention.

Accordingly, reconsideration and withdrawal of the rejection is respectfully requested

B. Lampe-Onnerud in view of Lee

The Office Action rejects claims 2-5 under 35 U.S.C. §103(a) over Lampe-Onnerud in view of U.S. Patent Application Publication No. 2004/0076884 to Lee et al. ("Lee"). Applicants respectfully traverse the rejection.

The Office Action concedes that Lampe-Onnerud fails to disclose an amorphous material as required by claims 2-5. The Office Action asserts that Lee discloses coating a cathode material with Al_2O_3, and further asserts that it would have been obvious for one of ordinary skill in the art to substitute the coating disclosed by Lampe-Onnerud with the coating disclosed by Lee for the benefit of increasing the voltage and the capacity of the battery. *See* Office Action, page 5.

As discussed above, Lampe-Onnerud does not teach or suggest a composite oxide powder having a total composition represented by the formula of claim 1.

Lee, cited only against dependent claims 2-5, does not teach or suggest a composite oxide powder having a total composition represented by the formula of independent claim 1. Lee thus does not overcome the deficiencies of Lampe-Onnerud, as discussed above.

Additionally, there is no motivation to combine Lee with Lampe-Onnerud. Lee is directed to $LiCoO_2$ cathode materials, whereas Lampe-Onnerud is directed to $LiNiO_2$ materials. Lampe-Onnerud discusses the differences between the two types of materials, including that $LiNiO_2$ materials are less safe than $LiCoO_2$ materials. *See, e.g.*, paragraph [0003]. As discussed above, one of the key features taught by Lampe-Onnerud is that the Co/Ni ratio of the coating material is greater than that of the core material, creating a gradient of diminishing Ni concentration from the core to the surface of each particle, giving a material that is safer, has a higher capacity, and demonstrates higher cyclability, than found in $LiCoO_2$ systems. Substituting the coating material of Lampe-Onnerud with the coating material of Lee would not create the gradient disclosed by Lampe-Onnerud (as there would be

no Ni or Co in the coating). Also, none of the cited references teach or suggest that such a modification would produce the results Lampe-Onnerud was seeking to achieve and, in fact, the entire disclosure of Lampe-Onnerud indicates that the coating composition was critical to achieving the desired results. It is well-established that if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

For at least the reasons discussed above, Lampe-Onnerud and Lee would not have rendered claims 2-5 obvious. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

III. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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JAO:JLR/sxl

Attachments:
Terminal Disclaimer
Petition for Extension of Time

Date: May 5, 2008

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